

RF exposure information

Product information from applicant

Applicant : TAKAYA Corporation
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 FCC ID : MK4C106-A3540
 ISED ID : 31742-C106A3540
 Product description : RFID READER/WRITER
 Operating frequency range : 13.56 MHz
 Maximum field strength at 3m (Measured) : 69.8 dBuV/m

Analysis for mobile use

[FCC]

The MPE limits for “General Population/ Uncontrolled Exposure” listed in the below table shall be used to evaluate the environmental impact of human exposure to RF radiation as specified in 47 CFR § 1.1307(b).

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz

*Plane-wave equivalent power density

NOTE: General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure. For example, RF sources intended for consumer use shall be subject to the limits for general population/uncontrolled exposure.

Since the product operates at 13.56 MHz, the power density limit is calculated to be 0.976 mW/cm² (= 180 / 13.56²).

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In the case of a single radiating antenna, a prediction for power density around the RF source can be made by the following equation.

$$S = \text{EIRP} / 4\pi R^2$$

where:

EIRP = effective isotropically radiated power (in mW/)

R = evaluation distance, i.e. separation distance to the center of radiation of the antenna (in cm)

The maximum EIRP of the product is 0.00288 mW (-25.4 dBm), which is estimated from the maximum field strength (69.8 dBuV/m at 3m) minus 95.2 dB. Using the 20 cm separation distance, the power density is calculated to be 5.74×10^{-7} mW/cm², which is below the power density limit (0.976 mW/cm² for 13.56 MHz).

Therefore, the product complies with the exposure limits at 20 cm separation and no further evaluation is required.

[ISED]

Field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element of the product is greater than 20 cm, except when the source-based, time-averaged maximum EIRP of the product is equal to or less than 1 W (adjusted for tune-up tolerance).

The maximum EIRP of the product is 2.88×10^{-6} W (-25.4 dBm), which is derived from the maximum field strength (69.8 dBuV/m at 3m) minus 95.2 dB, and is less than the above exemption limit (1 W for 13.56 MHz).

Thus the product meets the exemption from the routine evaluation limits in Section 6.6 of RSS-102 Issue 6, and FRL exposure evaluation is not required.

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